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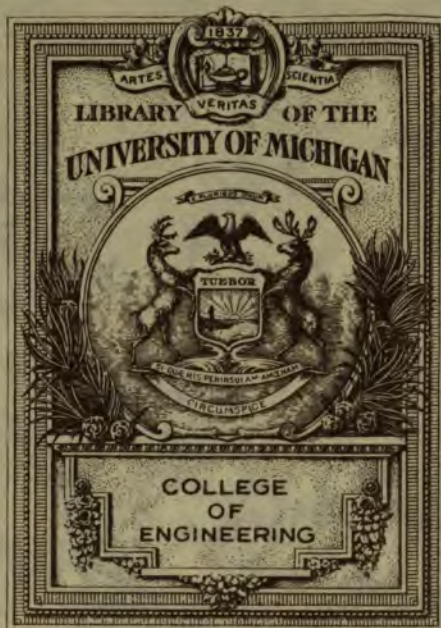
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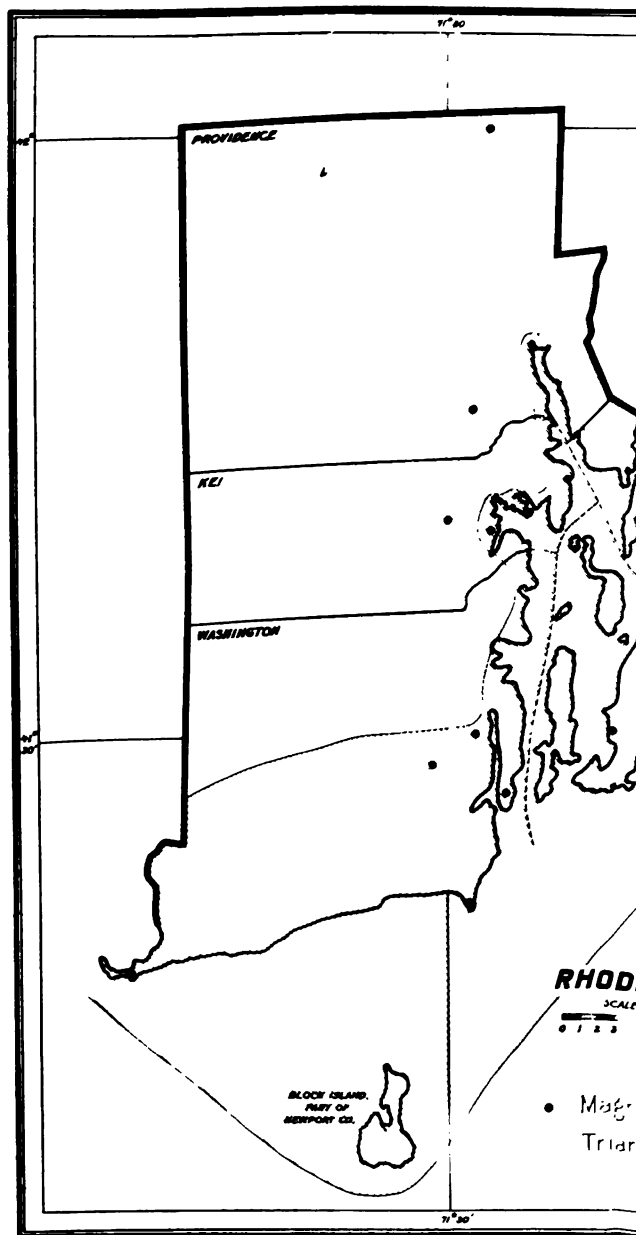
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## DIGEST OF GEODETIC PUBLICATIONS ISSUED BY THE UNITED STATES COAST AND GEODETIC SURVEY RESULTING FROM SURVEYS IN THE STATE OF RHODE ISLAND.

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The branch of the Government now known as the Coast and Geodetic Survey was authorized by act of Congress in 1807, under the administration of President Thomas Jefferson. From then until the seventies the work of the bureau was confined almost wholly to surveys of the coasts of the United States necessary to produce nautical charts. To fix the geographic positions for these charts it was necessary to establish points of control, and, incident to this, geodetic surveys were made of the east and west coasts of continental United States. These included base measurements, triangulation, astronomic observations, leveling, magnetic observations, etc.

In 1871 the duties of the bureau were broadened to include the making of geodetic surveys of the interior of the country which should serve both to connect the triangulation on which the coast charts of the Atlantic and Pacific coasts were based, as well as to establish a geodetic control for mapping and surveying projects in the interior of the country, and in 1878 the name of the then Coast Survey was changed to Coast and Geodetic Survey.

In the interval between 1871 and the present time this work has extended in some of its branches to every State in the Union. While these surveys serve as the framework for large mapping and surveying projects throughout the country, as well as to determine State and national boundaries, there is no reason why the data resulting from them, when the points are within available distance, should not be used for local projects. Indeed, economy of effort in making local surveys will follow if advantage is taken of previously established standard points of control because they are basic, and where local surveys intervene between these standard controls there is a check on the accuracy of the local work.

In mapping a small area of the earth's surface a high degree of accuracy is not generally attempted in establishing the geographic position of the initial point. The result is that were it attempted to join several such small maps together into a homogeneous whole it would be found that there would be a certain degree of inaccuracy which would result in overlaps, gaps, and offsets. This is a problem that is often met where independent small projects are undertaken to be joined later into a continuous map. The reasons are that the areas covered are small and are not coordinated to a scheme of triangulation embracing the whole country. Similar difficulties follow where small leveling projects are based on independent and arbitrary datums. In addition to the gaps and overlaps that develop when areas independently mapped, each based on local and generally arbitrarily selected controls, are joined together there is a more serious outcome in that positions must be recomputed from time to time as adjustments are made and different arbitrary standards are adopted until finally a proper standard is developed.

The purpose of this leaflet is to make available to those engaged in local surveying projects and others the results of the standard data established by the Coast and Geodetic Survey, so there will be an economy of effort in carrying on local surveys and saving of expense in their recomputation at later dates. For the reason that the systems of triangulation and leveling by the Coast and Geodetic Survey extend over wide areas, the publications containing these data are not confined to any one State in the Union, but generally contain results for many States. To get this information in compact form this leaflet has been prepared. It contains a digest of the work of the bureau in the State of Rhode Island. In it are shown the places where observations have been

made and, by tabulation, the publication of the bureau containing the results. It is not the purpose to present in this paper an exhaustive citation of all the uses to which these data can be put. Their uses are obvious to the engineering profession, and therefore the main purpose of this summary is to make known their existence and how and where they are available.

### **TRIANGULATION.**

The advantages of determining the positions of even farm and ranch boundary monuments by triangulation are not, it is believed, fully appreciated. However, they are obvious when it is considered that the exact positions of such monuments can be redetermined by triangulation though the monuments be absolutely destroyed. This is not necessarily true of boundary monuments that depend for their redetermination on the continued existence of the stones, trees, stumps, etc., that mark them. While the initial cost in most instances, where standard data are within available distance, of basing even farm and ranch surveys on points established by triangulation connected with standard controls would possibly be greater than to base them on natural objects determined only by compass bearings, the assertion is ventured with confidence that the ultimate cost would be much less if we take into consideration the necessity for resurveys from time to time and the uncertainty resulting from inability to relocate lost corners, with consequent litigation costs, etc. Triangulation stations of the United States Coast and Geodetic Survey on the coast and in the interior of the country are used more and more in controlling maps and surveys, and also as monuments in private-property surveys. The latter is especially true in the State of Massachusetts. The increased use of triangulation stations for this purpose is urged upon engineers and surveyors in work involving the location and perpetuation of private-property lines or boundaries.

### **ELEVATIONS ABOVE MEAN SEA LEVEL (PRECISE LEVELS).**

With the increased demands for accurate topographic maps of the country, the wonderful extension of our good-roads movement, the extension of the railroads, and the development of river, irrigation, canal, and drainage projects, the net of precise leveling that has been partly extended over the country by this bureau affords bases for local projects that it is feared are not fully known and taken advantage of by those interested.

There are in most States of the Union lines of precise levels that are determined with the highest degree of precision. These are all based on the same datum plane (mean sea level), and where they are within available distance to use as the standard for local leveling projects enable the local surveyor to base his elevations on a standard datum and afford an invaluable check on the local work if it intervenes between two or more of these standard leveling bench marks.

### **VARIATION OF COMPASS.**

All civil engineers are familiar with the use of the surveyor's compass, but many are not aware of the fact that this bureau has made a magnetic survey of the United States, which includes the determination of the declination (variation of the compass) at nearly every county seat in the country. The true meridian has been marked at many of these stations, and at all of them the true bearings of several prominent objects from the station have been determined and recorded. To reestablish old boundary lines run originally by compass, of which the boundary marks have been lost, it is necessary to know the change in the magnetic declination between the date of the original survey and the resurvey. As a result of its investigation, this bureau is prepared to supply information on this subject from the date of the earliest available observations to the present time for any locality in the United States.

## PUBLICATIONS.

The data resulting from the geodetic surveys by this bureau in the State of Rhode Island are contained in one publication that has been issued by this bureau. To enable an intelligent selection to be made of data of local interest, the counties of the State of Rhode Island are listed in alphabetical order, and by a tabular arrangement are shown the publication containing the triangulation data for the State of Rhode Island and the pages in the publication where the data will be found.

In the tabulation that follows the title of the publication is at the top of the column. Special Publication No. 62 contains the final results of all of the triangulation by the Coast and Geodetic Survey in the State of Rhode Island. Another publication, Appendix 8 of the Annual Report of the Coast and Geodetic Survey for 1885, gives the results of the triangulation completed up to that time, but all of this material is combined in Special Publication No. 62. For example, if an engineer is interested in the description of the triangulation station Mount Hope, 2, in Bristol County, he will turn to Bristol County in the alphabetical arrangement of the counties, and the tabulation shows that the description is on page 64 of Special Publication 62.

| County and place. <sup>1</sup>   | Triangulation: descriptions of stations: Special publication No. 62. | County and place. <sup>1</sup>    | Triangulation: descriptions of stations: Special publication No. 62. |
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<sup>1</sup> Magnetic observations have been made at the places indicated above by the asterisk. For further details, see note on p. 7.

| County and place. <sup>1</sup>                      | Triangulation; descriptions of stations: Special publication No. 62. | County and place. <sup>1</sup>      | Triangulation; descriptions of stations: Special publication No. 62. |
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<sup>1</sup> Magnetic observations have been made at the places indicated above by the asterisk. For further details, see note on p. 7.